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Tanner

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(54) **PITCHING MACHINE**

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(51) **Int. Cl.**[7] **F41B 11/14**
(52) **U.S. Cl.** **124/16**; 124/21; 124/7
(58) **Field of Search** 124/16, 17, 21, 124/31, 36, 78, 7

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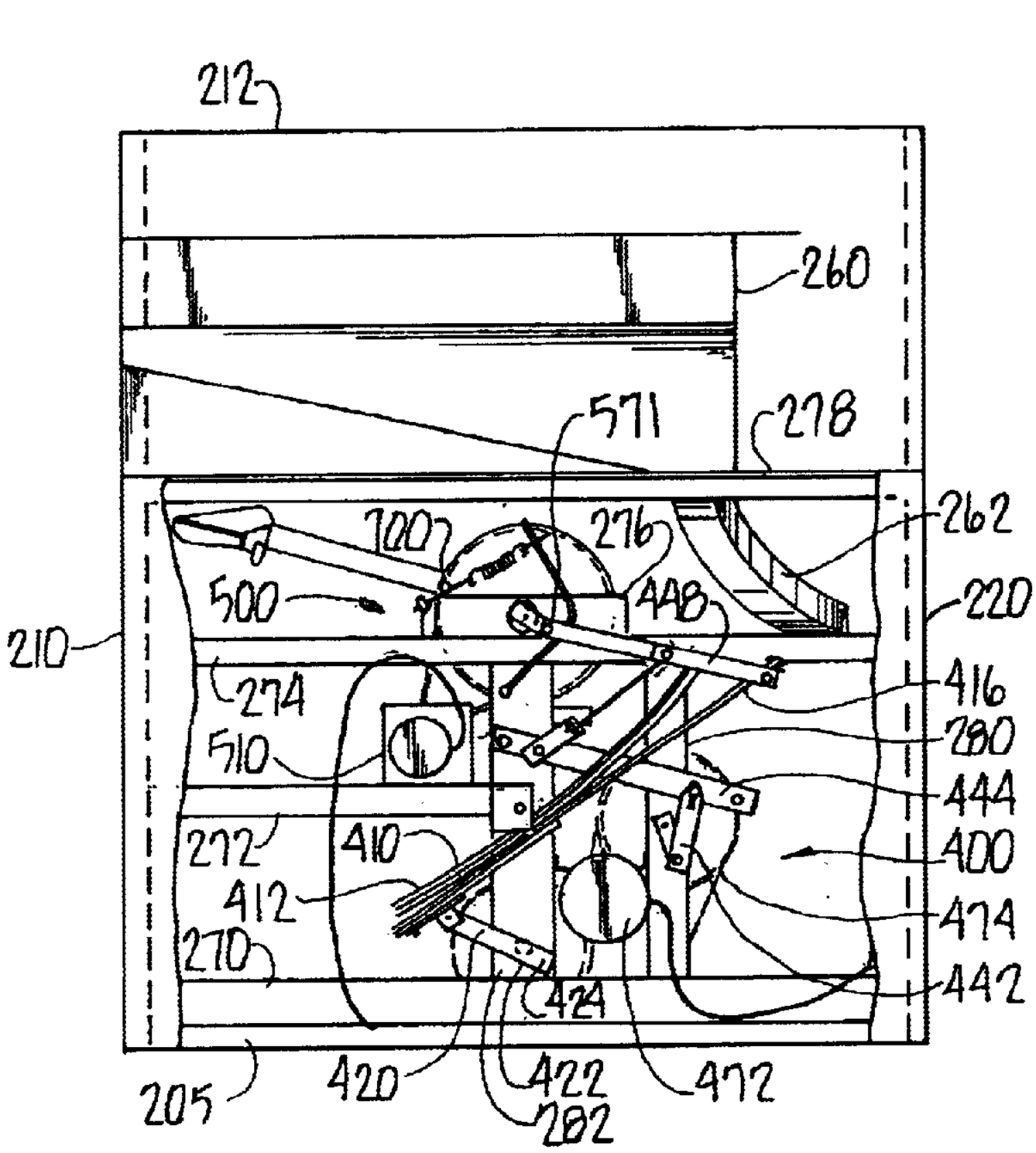
(57) **ABSTRACT**

A ball pitching machine utilizes a leaf spring coupled by linkage to a ball pitching arm. The flexion of the spring can be adjusted by varying the time of operation of a motor driven spring flexion assembly. Upon the selectable spring flexion being achieved, the user then energizes a ball pitching arm for rotation of the arm through a rest position, a ball pick up position and then to a ball release position. During arm rotation, the arm is first coupled to the spring by a linkage assembly such that further rotation of the arm causes the stored energy in the spring to be released to the arm at a position to effect the ball trajectory. The ball trajectory compensates for the various ball speeds so that the ball penetrates the batter's strike zone. This energy transfer accelerates rotation of the arm to a ball release position, the speed of the ball, as perceived by the batter, corresponding in part to the spring flexion and/or ball trajectory as selected by the user.

23 Claims, 5 Drawing Sheets



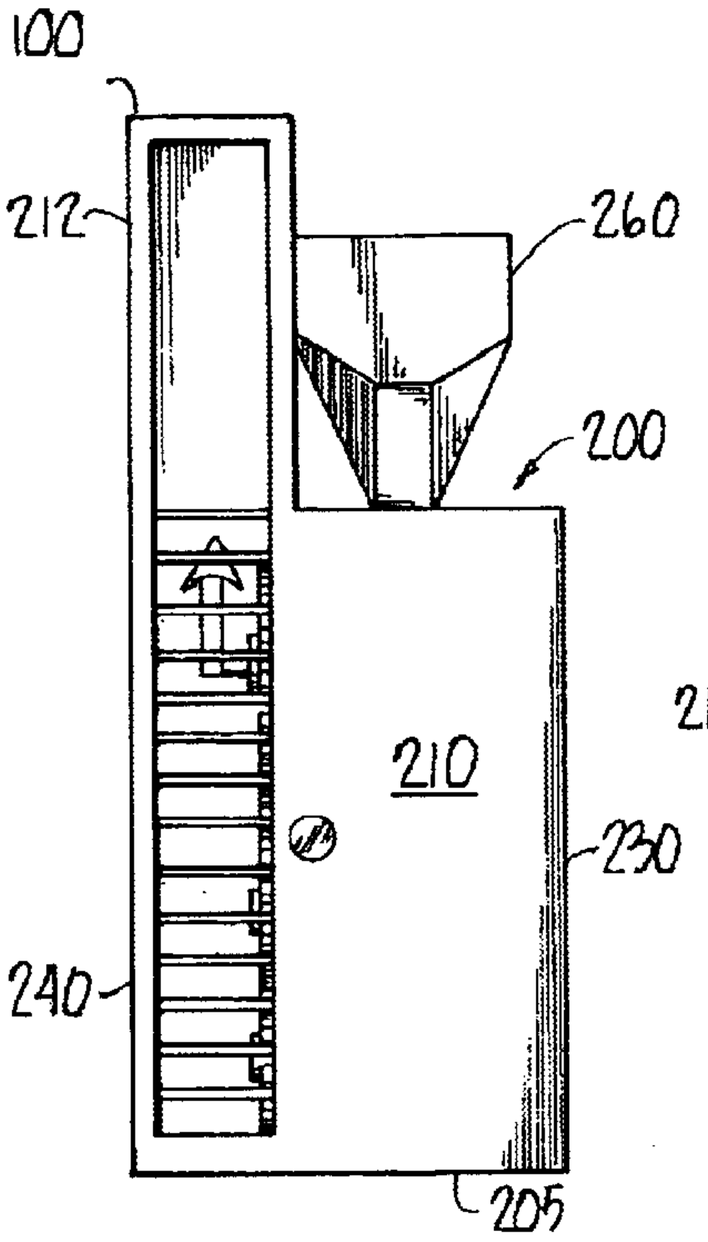


Fig. 1

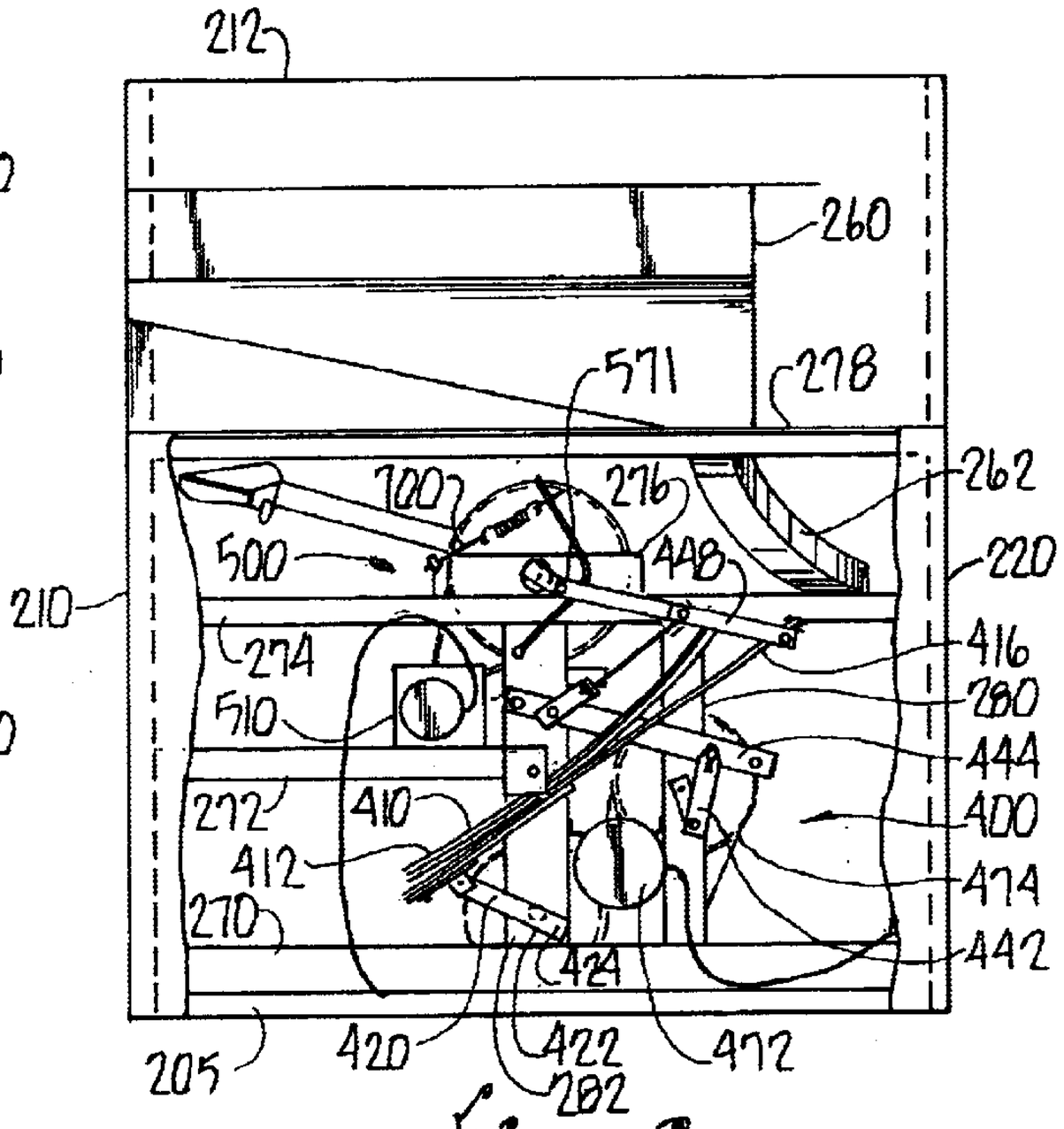


Fig. 2

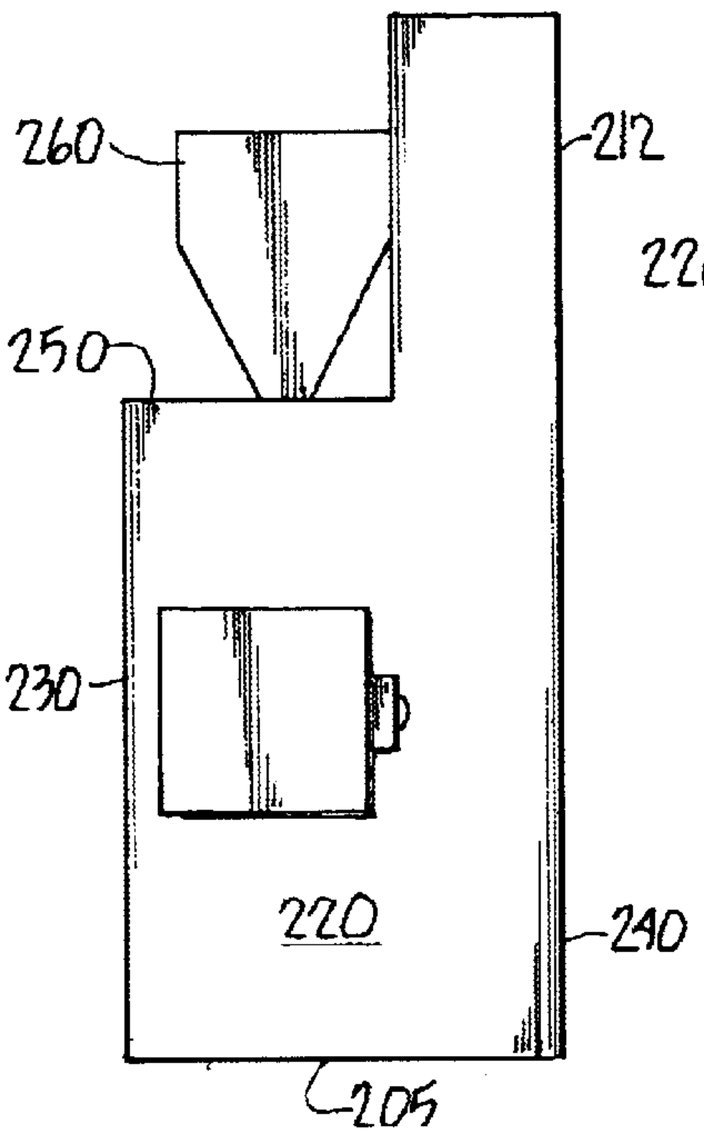


Fig. 3

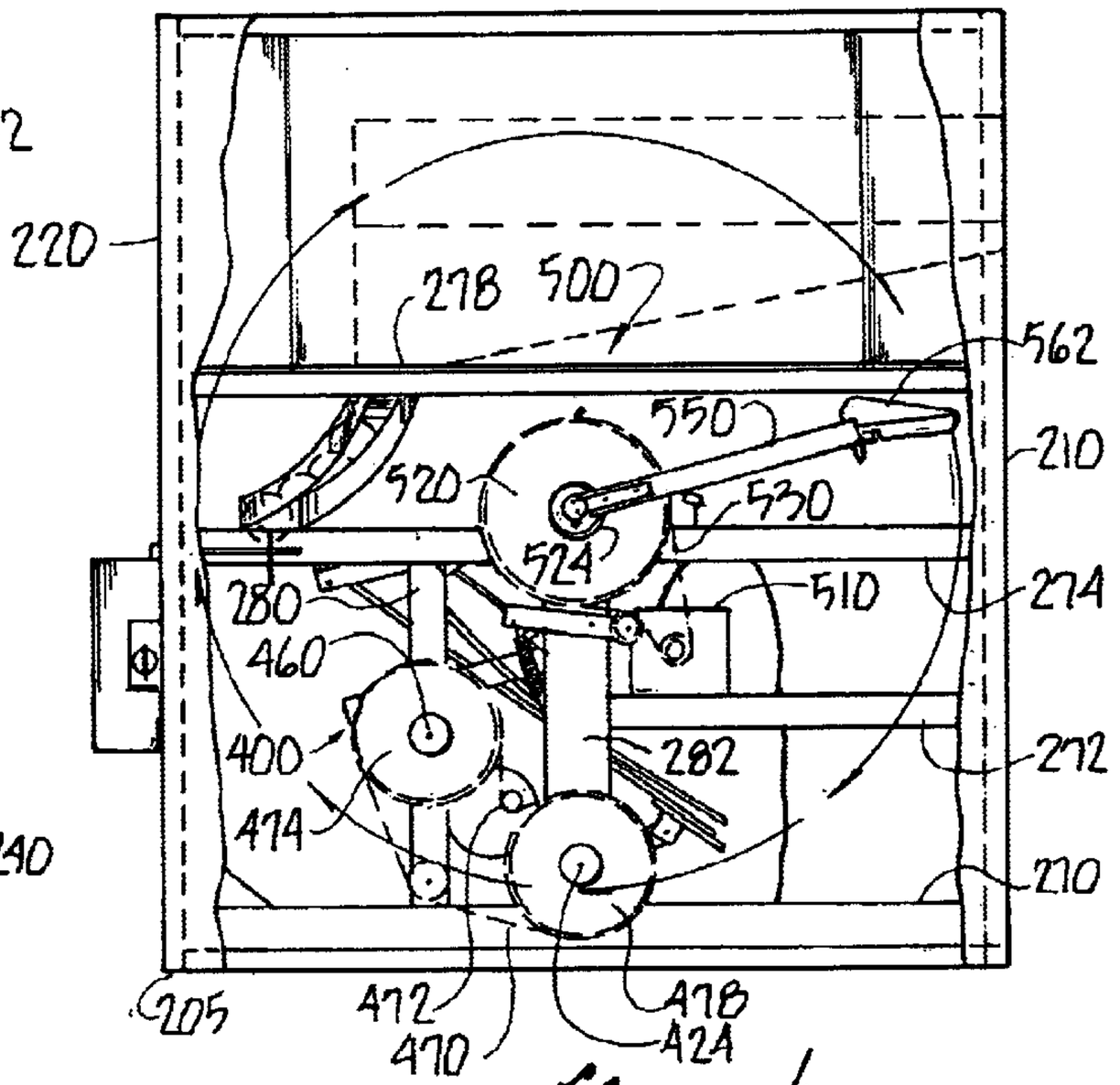


Fig. 4

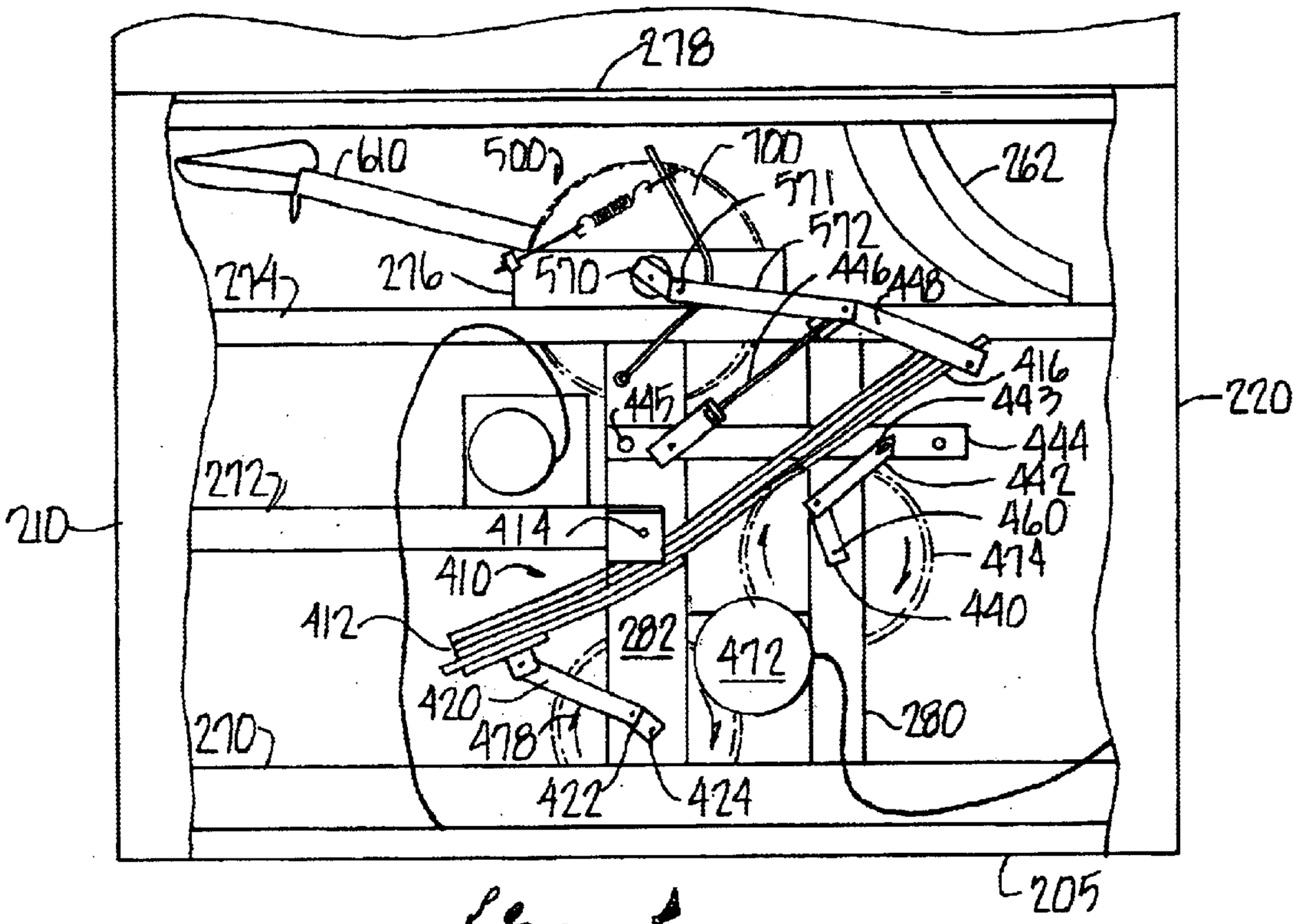
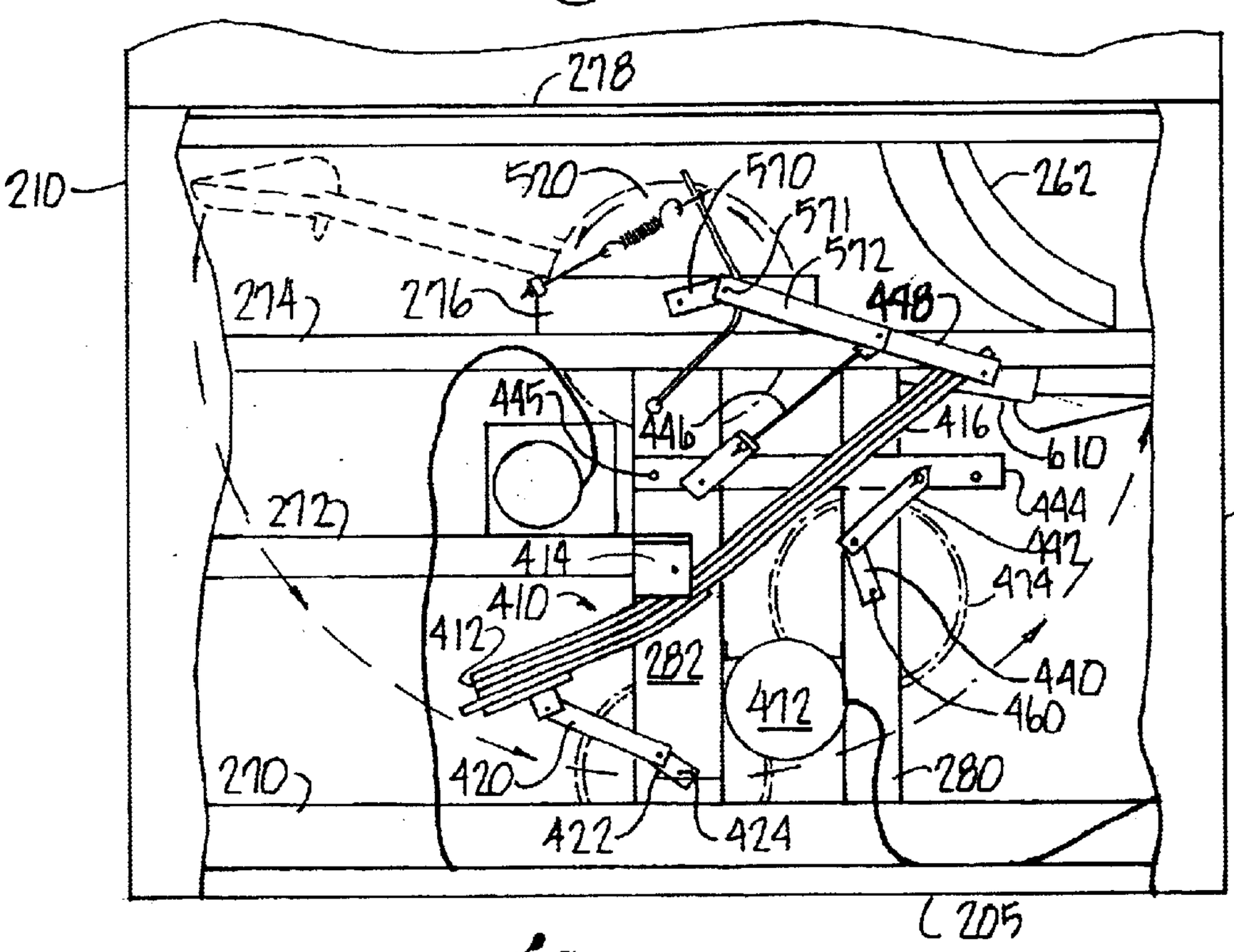

278
610
500
700
571
572
262
274
276
570
446
448
445
416
443
444
442
460
474
440
414
410
412
282
472
420
478
280
422
424
272
270
210
220
205

Fig. 5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412
282
472
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Fig. 6

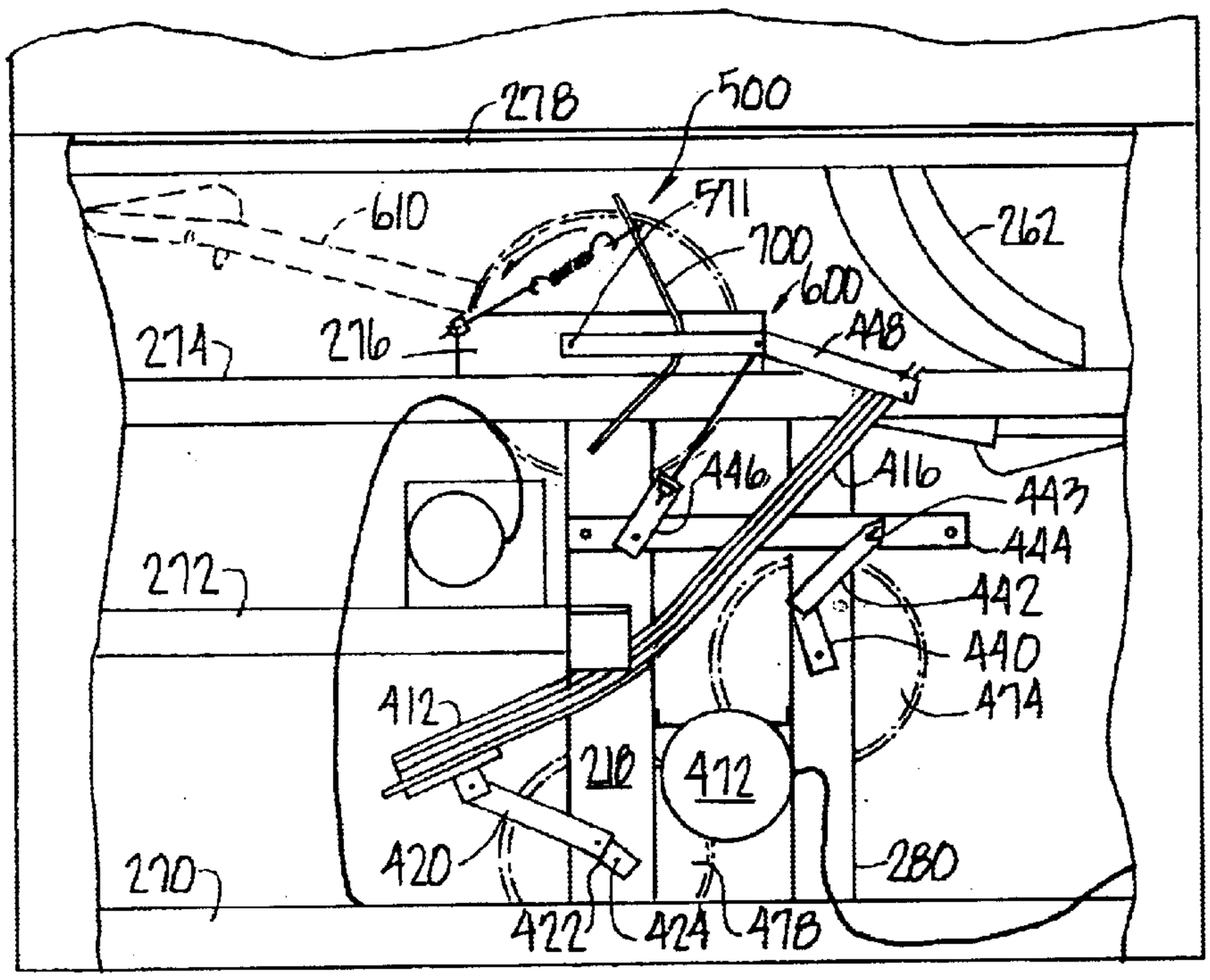

Fig. 7

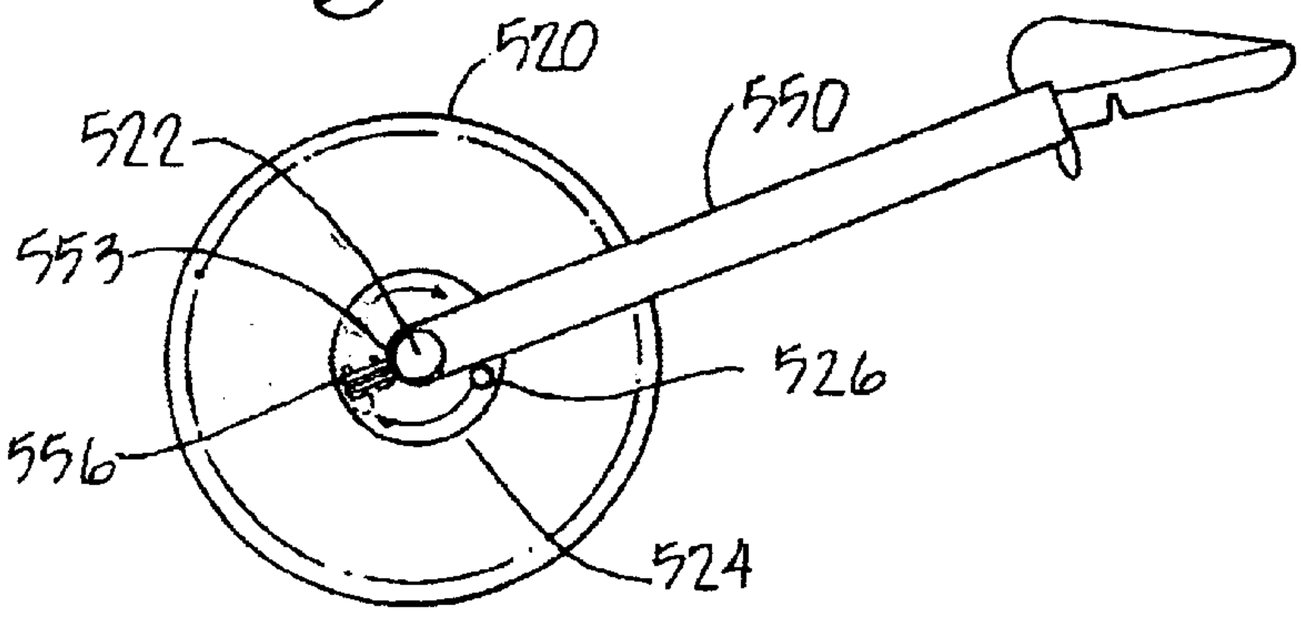

Fig. 8

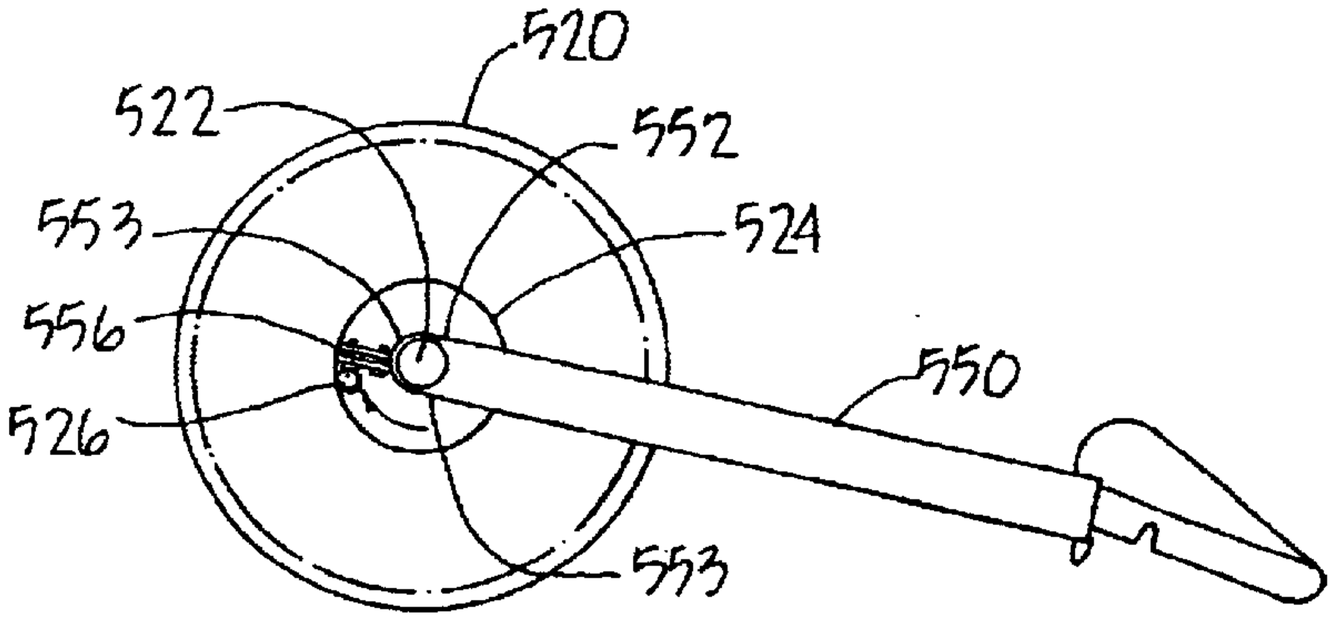

Fig. 9

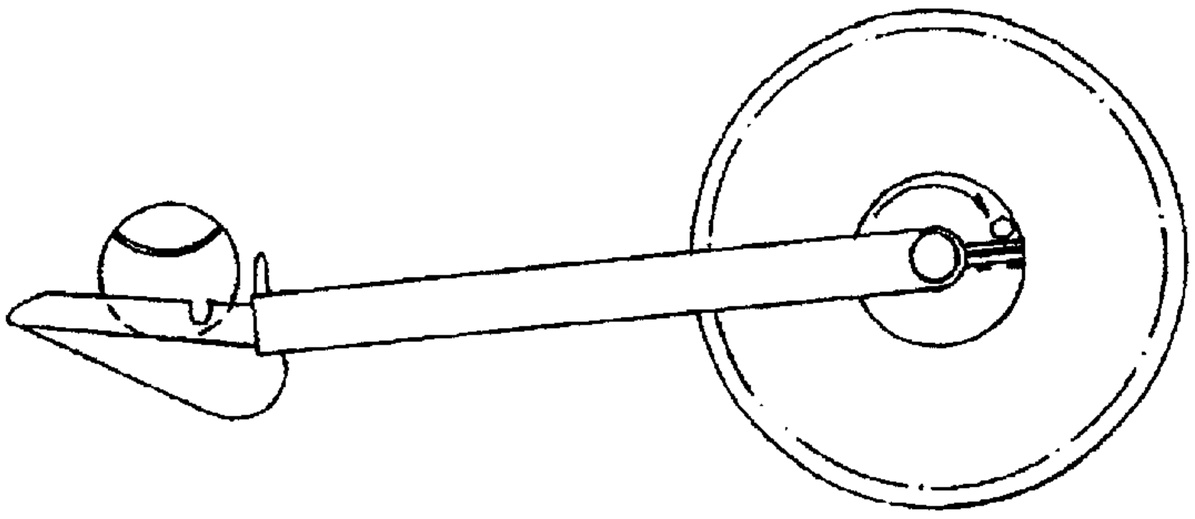

Fig. 10

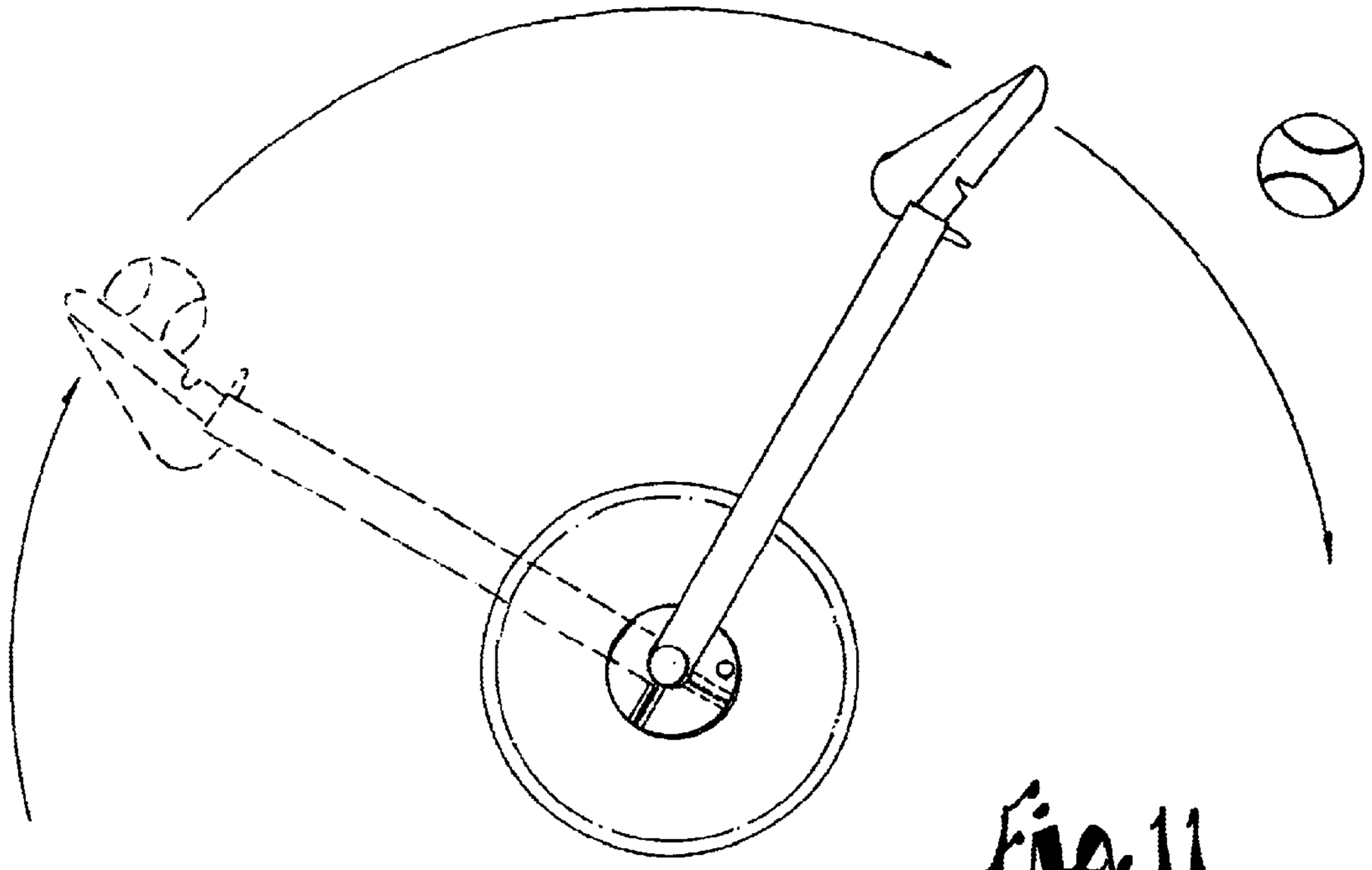

Fig. 11

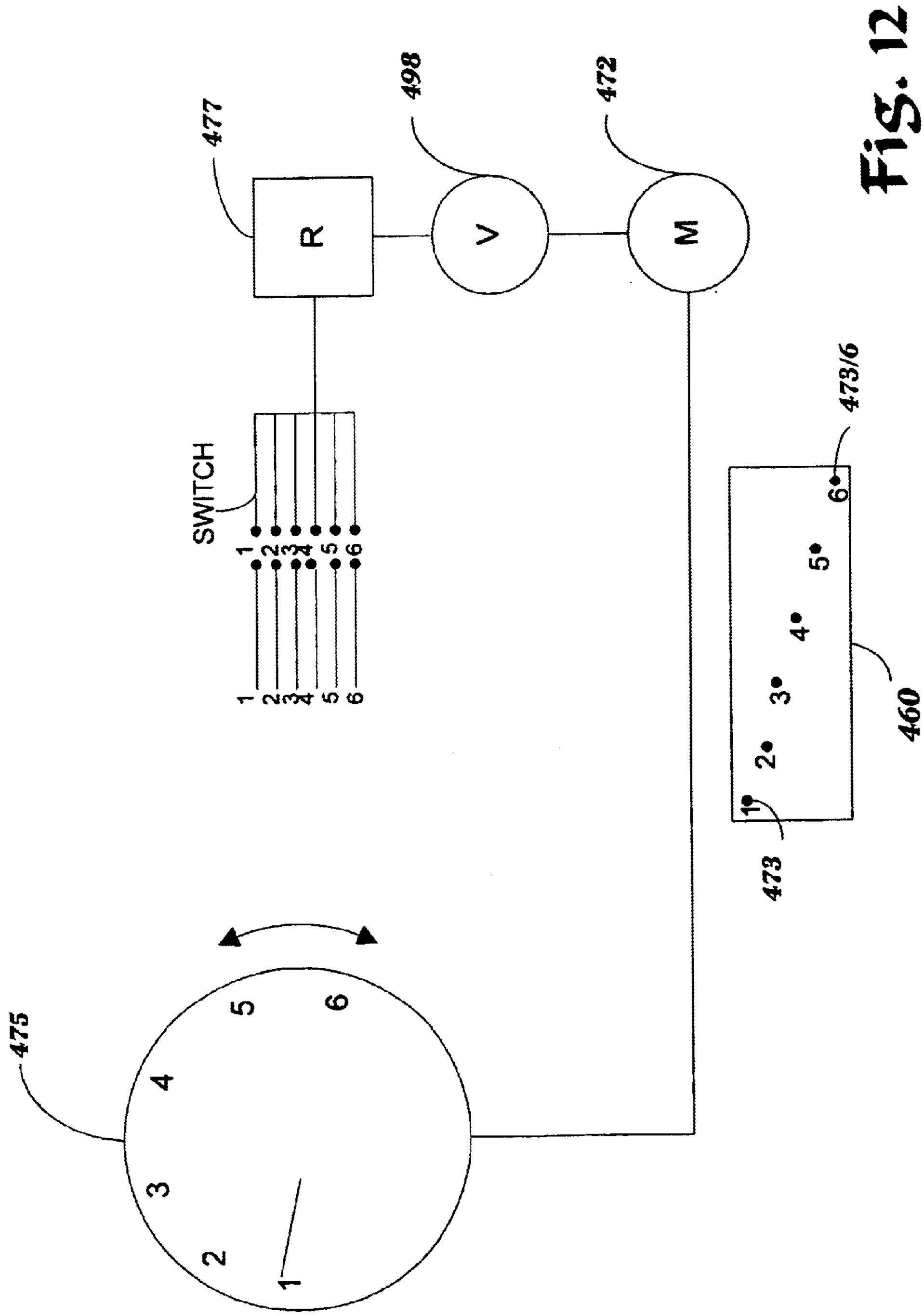
477
498
472
R
V
M
SWITCH
1 2 3 4 5 6
1 2 3 4 5 6
473/6
6
5
4
3
2
1
473
460
475
1
2
3
4
5
6

Fig. 12

PITCHING MACHINE

BACKGROUND OF THE INVENTION

This invention pertains to a pitching machine and, more particularly, to a ball pitching machine for pitching a ball at different user-selectable trajectories and/or speeds.

Various forms of ball pitching machines are known in the prior art which are said to simulate the speed and trajectory of balls as if pitched by an actual person.

In order to more accurately simulate the action of a pitched ball it is desirable to utilize a machine having a pitching arm. One problem with past machines was the inability to effectively vary the speed of the pitched ball as hurled from the pitching arm as manual adjustment of the machine was required. Thus, it is desirable to have such a function so that a range of users can effectively utilize one machine.

In response thereto I have invented a pitching machine which utilizes an elongated spring powered pitching arm. My machine utilizes a leaf spring which can be selectively flexed according to the desired speed of the pitched ball. Once flexed the spring is then releasably coupled to the pitching arm during rotation of the arm from a rest position to a ball release position. Subsequent to ball pick up the energy of the selectively flexed spring is released to the pitching arm so as to urge the arm towards its ball release position for ball release at a different trajectory. Accordingly, the degree of flexion of the spring controls in part the speed of the arm in rotatable movement to the ball release position and thus the speed and trajectory of the ball hurled therefrom.

Accordingly, it is a primary object of my invention to provide a pitching machine capable of simulating a pitched ball.

Another object of this invention is to provide a pitching machine, as aforesaid, wherein the speed of the pitched ball can be regulated.

Still another object of this invention is to provide a pitching machine, as aforesaid, which regulate the energy stored in a flexed spring for regulating the ball speed.

A further object of this invention is to provide a pitching machine, as aforesaid, wherein the degree of initial spring flexion is selectable by a user.

A still further object of this invention is to provide a pitching machine, as aforesaid, wherein the pitching arm is coupled to the flexed spring during movement from a ball rest to a ball release position for further spring flexion.

A particular object of this invention is to provide a pitching machine, as aforesaid, wherein a plurality of balls can be delivered for sequential pick up by the ball pitching arm.

A more particular object of this invention is to provide a pitching machine, as aforesaid, wherein the initial leaf spring flexion is provided by a motor driven chain drive assembly, which is regulated by a user.

Another particular object of this invention is to provide a pitching machine, as aforesaid, wherein the leaf spring is initially flexed by a first spring flexing assembly and then further flexed by rotation of the pitching arm.

A further particular object of this invention is to provide a pitching machine, as aforesaid, wherein the trajectory of the pitched ball can be regulated so as to deliver the ball at different speeds to the batter in the strike zone.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings, wherein is set forth by way of illustration and example, a now preferred embodiment of this invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front view of the pitching machine housing;

FIG. **2** is a left side view of the pitching machine with a wall of the housing broken away to show the apparatus therein at a rest position;

FIG. **3** is a rear view of the FIG. **1** pitching machine housing;

FIG. **4** is a right side view of the pitching machine with the right side wall broken away to show the apparatus therein in a rest position with the arrows indicating the rotatable path of the pitching arm;

FIG. **5** is a left side view of the pitching machine showing the spring apparatus at an initial second flexion position beyond the FIG. **2** position;

FIG. **6** is a left side view of the pitching machine as shown in FIG. **5** showing the spring apparatus beyond said second FIG. **5** flexion position as provided by rotation of the wheel and coupled pitching arm from the phantom line rest position to the solid line ball pick up position;

FIG. **7** is a left side view of the ball pitching machine in FIG. **6** showing a further flexion of the leaf spring in FIG. **6** as provided by further rotation of the pitching arm wheel and pitching arm;

FIG. **8** is a diagrammatic view showing the position of the pitching arm wheel and arm at a rest position with the hub stop on the pitching arm drive wheel displaced from the pitching arm bracket;

FIG. **9** is a diagrammatic view showing a subsequent contact of the hub stop of the pitching arm wheel with the pitching arm bracket upon clockwise rotation of the pitching arm wheel;

FIG. **10** is a diagrammatic view showing the position of the pitching arm in its ball pick up position upon further clockwise rotation of the wheel and pitching arm;

FIG. **11** is a diagrammatic view of the pitching arm showing in phantom lines the pitching arm upon clockwise rotation to an over center position and in solid lines the pitching arm at its ball hurling position, the hub stop being free of the pitching arm bracket;

FIG. **12** diagrammatically shows one form of a spring flexion motor/switch/circuit combination.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning more particularly to the drawings, FIGS. **1** and **3** show my pitching machine **100** encompassed by a housing **200**. Housing **200** has a base **205**, front **210**, rear **220**, side **230**, **240** and top **250** walls. Walls have been broken away in the drawings for ease of illustration. The front wall **210** presents a vertical extension **212** allowing for rotation of pitching arm **550**. A ball hopper **260** communicates with an opening in the top wall **250** for delivery of the balls via trough **262** to a ball rest **264**.

Within the housing **200** is enclosed the pitching apparatus as supported by frame work including horizontal **270**, **272**, **274**, **276**, **278** and vertical **280**, **282** struts. The pitching apparatus generally comprises a rotatable pitching arm assembly **500**, a spring tension assembly **400** and an assembly for linking the tension of spring **410** to pitching arm **550**.

The spring tension assembly **400** includes a multi-leaf spring **410** which is mounted at an intermediate point to bracket **414** which in turn is mounted to vertical strut **282**. As such a lower spring end **412** and an upper spring end **416** is presented which are flexed relative to this intermediate mounting bracket **414**.

The lower end **412** of spring **410** is connected to a linkage arm **420** which is pivotally linked to arm **422**. Arm **422** is connected to a shaft **424** which extends through vertical frame strut **282**. This shaft **424** is driveably connected to a cogged wheel **478** such that rotation of wheel **478** causes rotation of shaft **424** and rotation of linkage arms **420**, **422** linked thereto.

The upper spring end **416** is linked to a cogged wheel **474** via intermediate linkage comprising arms **440**, **442**, **444**, connecting rod **446** and linkage arm **448**. One end of arm **444** is pivotally connected to frame strut **280** at **445** with the other end pivotally connected to arm **442** at **443**. Arm **442** is in turn pivotally connected to arm **440** which is connected to a shaft **460** which extends through vertical strut **282** and is connected to wheel **474**.

As shown in FIG. **4** the spring tension assembly **400** further includes a chain **470** driven by an electric motor **472** shaft and wound about the cogged wheels **474**, **478** and idler wheels. Energization of motor **472** results in a chain driven rotation of wheels **474**, **478**, associated shafts **424**, **460** and linkage arms **420**, **422**, **440**, **442**. Rotation of these linkage arms imparts clockwise flexion to the lower spring end **412** and counterclockwise flexion of the upper end **416** of leaf spring via the linkage arm **444**, rod **446**, arm **448** combination as viewed in FIGS. **2**, **5**, **6** and **7**.

As shown in FIG. **4** the pitching arm drive assembly **500** includes a motor **510**, chain **530** driven wheel **520** and idler wheels. Wheel **520** is rotatably mounted about a shaft **522** extending through a frame strut **276** atop strut **282** (FIG. **5**). Wheel **520** presents a central hub **524** having a lug/hub stop **526** thereon. One end **552** of the pitching arm **550** is attached to a sleeve **553** which rotatably encompasses the shaft **522**. Thus, arm **550** can be independently rotated about shaft **522**. The end **552** of pitching arm **560** presents a bracket **556** which is rotatable with arm **550**.

As diagrammatically shown in FIGS. **8–11**, the energization of electric motor **510** rotates wheel **520** via drive chain **530**. Pitching arm **550** will not rotate about shaft **522** until hub stop **526** contacts bracket **556** as shown in FIG. **9**. At this point further rotation of wheel **520** will also rotate pitching arm **550** from a FIG. **9** position to a FIG. **10** ball pick up position and then to a FIG. **11** phantom line over center position due to the hub stop **526**/bracket **556** contact.

A plurality of normally closed switches **1–6** or equivalents in an electrical circuit is diagrammatically shown in FIG. **12** as adjacent to motor **472** shaft **471**. Such switches are mounted on frame adjacent motor **472** shaft **471**. The user has a displaced rotary switch in series with these six parallel switches. These switches are part of an electrical circuit including rotary switch **475** at the selected position, relay **477**, power source **498** and motor **472**. Each switch is normally closed. Upon user selection of a particular position **1–6** of the rotary switch **475** the circuit energizes motor **472** and rotates the shaft **471**. Lobes **473**. on the adjacent rotating motor **472** shaft **471** will upon contact urge the related closed switch into an open position so as to open the particular circuit. The lobes **473** are arranged about the circumference of motor **472** shaft **471** such that lobes **1–6** correspond in a one-to-one relationship with switches **1–6**. Lobe **473/1** will first contact an adjacent switch **1**. Lobes **2–6** will subsequently contact adjacent switches **2–6**. The lobes are thus arranged about the motor shaft **471** such that rotary switch position I will energize the motor **472** for the least amount of time with rotary switch position **6**, energizing the motor for the maximum amount of time. Selection of rotary switch positions **2–5** will thus energize the motor **472** for successively longer increments relative to switch **1**. Thus, the motor **472** operates the least amount of time if rotary switch position **1** is selected and the longest amount of time if rotary switch position **6** is selected.

Although I proposed a circuit for mechanical opening of the switches by a related lug **473** on the rotating motor **472** shaft, other equivalent switching circuitry may be used so as to energize the motor **472** for selected periods of time. Motor **570** is also subsequently energized by a user. However, this motor **570**, once energized by a user, will operate for a set period of time.

In use FIGS. **2** and **4** illustrate the pitching machine apparatus at its rest/relaxed position. At this position the pitching arm **550** is at approximately a ten o'clock position (FIG. **2**) with the ends **412**, **416** of leaf spring **410** being at a normal position. Upon selection of a rotary switch position (**1–6**) the energized motor **472** chain drives wheels **474**, **478**. Thus, the associated linkage arms, as above described, are variably rotated upon rotation of the associated wheels **474**, **478**. This linkage arm rotation causes arm **420** to upwardly urge the lower end **412** of the leaf spring from a rest position and into a flexed position relative to the rest position (clockwise as viewed in FIGS. **2** and **5**). Concurrently, the linkage arms **440**, **422** are likewise being rotated about shaft **460** by rotation of the wheel **474**. This movement flexes the upper end **416** of the leaf spring **410** about its intermediate mounting point **414** (counterclockwise as viewed in FIGS. **2** and **5**) via the intermediate linkage arms **444**, **446**, **448**. Note in FIG. **5** that the displaced leaf of the spring **410** at the upper end (FIG. **2**) is now contiguous to the adjacent leaf in FIG. **5** while the lower end **412** of the spring has been moved clockwise from its FIG. **2** position.

Accordingly, leaf spring **410** is now flexed which increases the potential energy stored therein. As the selectable rotary switch positions **1–6** varies the amount of time of motor **472** operation, the amount of movement of the linkage arms and thus flexion of the associated lower and upper ends of the leaf spring **410** can be controlled from a minimum flexion (switch **1**) to a maximum flexion (switch **6**). Thus, FIG. **5** shows the spring being at one user selectable flexed position which can be chosen from a plurality of six possible flexed positions. Thus, the degree of flexion of the spring **410** depends on the rotary switch position (**1–6**) selected corresponding to the time of motor **472** operation. This stored energy of the flexed spring **410** can now be transferred to the pitching arm **550**.

Subsequent to spring **410** flexion, the pitching arm **550** is rotated by user closure of a circuit which energizes motor **510**. Initially drive wheel **520** rotates independent of pitching arm **550** as hub stop **526** is free of bracket **553**. During rotation of wheel **520** the lug/stop **526** on the hub **524** contacts pitching arm bracket **553** as shown in FIG. **9**. At this position the further rotation of wheel **520** also rotates bracket **553** and arm **550** due to this stop **526**/bracket **553** contact. At this FIG. **9** position, rotation of the arm **550** likewise rotates the linkage **570** arm connected to sleeve **553** and arm **572** pivotally connected to arm **570**. Movement of these linkage arms **570**, **572** is transferred to connected arm **448** which is connected to spring **416** end. Thus, the hub stop **526** contact moves the linkage arms **570**, **572**, **448** which further flexes the upper end **416** of spring **410** from the

earlier flexed position. Note that FIGS. **6** and **7** show further successively greater flexion due to the rotation of the pitching arm **550** as coupled to the spring by these linkage arms.

Linkage arm **570** is pivotally connected to linkage arm **572** at pivot point **571**. The height of this pivot point **571** relative to the base **205** is ultimately controlled by rotation of wheel **474**. Thus, at switch position I the motor operation is the shortest such that pivot point **571** position is at its lowest. Switch position **6** places the pivot point **571** at the greatest height as motor **472** operates for the longest period. This pivot point **571** will have positions therebetween corresponding to positions **2–5** of the rotary switch. The height of pivot point **571** determines in part the "firing" position of the pitching arm **550**, i.e., the point at which the energy of the spring is transferred to the arm **550** during arm rotation. Basically, the higher the pivot point **571**, relative to the base **205**, the later the "firing" position of the arm **550** during its rotation and the lesser the trajectory of the ball hurled therefrom.

Upon rotation of the wheel **520** the scoop **562** on arm **550** will pass through the spaced-apart rods **264** of the ball rest so as to deposit the ball therein (FIG. **10**). Subsequent rotation of wheel **520** urges the hub stop **526**/flange **556** combination to an over center position, i.e., the phantom line FIG. **10** position.

At an over center position the braking contact of the stop **524**/bracket **556** combination loses its effect. Thus, the upper end **416** of flexed leaf spring **410** is free to move from its subsequently flexed position (clockwise, FIG. **7**) to its previous flexed position (FIG. **5**). This spring movement occurs at a point during arm rotation which transfer the energy of the flexed spring **410** to the arm **550** via the linkage arms **448**, **572**, **570** causing an accelerated rotation/"firing" of the arm towards a solid line ball hurling position (FIG. **11**). During this movement the ball is released from the scoop **562** and through the opening in the front wall **210** of the housing. Shock absorber apparatus **700** is connected to frame and pitching arm **550** so as to dampen the movement of arm after ball release to preclude arm damage.

As above described, the pivot point height is the lowest at position **1** and the highest at position **6**. The higher the pivot point the later the "firing" of the arm **550** as the path of transfer of energy from spring end **416** to arm **550**, defined by the linkage arms therebetween, varies from a straight line path. Thus the lesser the trajectory. Thus, at switch position **1** the pivot point **571** is at its lowest as motor **472** operates for the least amount of time. Thus, the "firing" position of arm **550** is at its earliest point during arm rotation resulting in the greatest ball trajectory. At switch position **6** the motor **472** operates for the greatest amount of time placing the pivot point **571** at its highest relative to base. Thus, the "firing" position of arm is at its latest point during arm rotation. This results in the least ball trajectory. Accordingly, at positions **2–6** successively later firing positions and lesser ball trajectories relative to position **1** result. Concurrently, the spring end **416** is being incrementally flexed from positions **1** to **6** which can also increase ball speed. Thus, the incremental decrease in ball trajectory and/or increase in spring flexion can contribute in part to the ball speed and thus the arrival time of ball after release.

After ball release the motor **510** returns the wheel **520** and arm **550** to their normal FIG. **8** position. The ball trough **262**/ball rest **264** combination has deposited another ball on the ball rest. Subsequently, the motor **510** can again be user energized causing rotatable movement of the arm **550** as above described through the rest, ball pick up, over center and ball hurling positions for a subsequent ball delivery. If the ball delivery speed is too slow or fast, an appropriate selection of the six rotary switch positions will vary ball speed/ball delivery time to the user due to the changes in ball trajectory or ball speed or both.

Accordingly, it can be seen that the spring tension assembly **400** is operable so as to move the spring **410** to one of six user selectable positions corresponding to a particular degree of spring flexion which in part determines ball speed. Also, the pivot point height **571** is being regulated which regulates the arm **550** "firing" position and thus ball trajectory. Once such position has been achieved, the pitching arm assembly **500** is user energized for rotation of arm **550** through a rest position, ball pick up position and over center position. During such rotation the arm **550** is coupled to the spring **410** for further flexion of spring **410**. Thus, the stored energy of the flexed spring **410** is available for delivery to the pitching arm **550**. Upon the arm **550** reaching the over center position the energy of the flexed spring **410** is transferred to the arm **550** via linkage arms as positioned corresponding to rotary switch positions **1–6**, causing an arm firing/accelerated rotation of the arm **550** and a ball release therefrom. Understandably the greater the spring flexion as selected by rotary switch positions **1–6** the more energy available for delivery to the arm rotation and the ball released therefrom. Also, the corresponding changes in ball trajectories can contribute to the speed in which the hurled ball reaches the user. I have found that the decreasing changes in ball trajectories at positions **1–6** cooperate with/compensate for the increasing changes in ball speeds at positions **1–6** so that the ball reaches the batter in the desired strike zone at such various switch positions.

It is to be understood that while a certain form of this invention has been illustrated and described, it is not limited thereto, except in so far as such limitations are included in the following claims and allowable equivalents thereof.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. An apparatus for propelling a ball, said apparatus comprising:

a frame;

a pitching arm, said pitching arm having a first end and a second end adapted for placement of a ball thereon;

means for rotatably mounting said pitching arm to said frame for movement of said second end from a first position to a subsequent ball release position;

a spring having first and second ends, said spring mounted to said frame;

means for flexing said first or second ends of said spring or both from a first spring position to a second flexed spring position chosen from a plurality of possible second spring positions;

means for coupling said flexed spring at said second position to said pitching arm during said rotation of said pitching arm towards said ball release position, a release of said flexed spring from said second position transferred to said pitching arm for rotating said pitching arm towards said ball release position and hurling a ball placed on said second arm end therefrom, a speed of the hurled ball determined in part by a degree of spring flexion corresponding to said selected second flexed spring position.

2. The apparatus as claimed in claim **1** wherein said coupling means includes means for changing a trajectory of the hurled ball.

3. The apparatus as claimed in claim **2** wherein the trajectory determines in part the speed of the hurled ball as presented to a batter.

4. The apparatus as claimed in claim 1 wherein said rotatable mounting means comprises:

a wheel rotatably mounted about an axis extending through said frame;

means for rotating said wheel;

a lug on said wheel, said first end of said pitching arm presenting structure adjacent said lug;

said rotating wheel urging said lug into contact against said first end structure of said pitching arm, wherein said contact concurrently rotates said pitching arm with said wheel towards said ball release position.

5. The apparatus as claimed in claim 4 wherein said coupling means comprises:

means for linking said first arm end to said spring at said contact whereby a rotation of said first arm end operates said linking means and flexes said spring linked thereto.

6. The apparatus as claimed in claim 1 wherein said spring flexing means comprises:

a first spring linkage assembly connected to said first end of said spring and mounted in movement with an associated axis extending through said frame;

a second spring linkage assembly connected to said second end of said spring and mounted in movement with an associated axis extending through said frame;

first means for rotating said axis associated with said first spring linkage assembly, said rotation causing a flexion of said first spring end connected to said first spring linkage assembly;

second means for rotating said axis associated with said second spring linkage, said rotation causing a flexion of said second spring end connected to said second spring linkage assembly;

means for regulating said first and second axis rotating means, wherein to regulate the flexion of said first end or second ends of said spring or both.

7. The apparatus as claimed in claim 6 wherein said first rotating means comprises:

a first shaft defining said associated axis of said first spring linkage assembly;

a first wheel rotatable with said first shaft;

an electric motor in selectable communication with a power source;

a chain driven by said motor and coupled to said first wheel to rotate said first wheel and said first shaft;

means for regulating communication of said motor with said power source, whereby to rotate said first wheel for movement of said first spring linkage assembly upon operation of said motor, a degree of rotation of said first wheel and said first shaft corresponding to a degree of movement of said first spring linkage assembly and said flexion of said first spring end connected thereto.

8. The apparatus as claimed in claim 7 wherein said second rotating means comprises:

a second shaft defining said associated axis of said second spring linkage assembly;

a second wheel rotatable with said second shaft, said chain coupling said second wheel to said motor to rotate said second wheel and said second shaft;

said means for regulating the communication of said motor with said power source rotating said second wheel for movement of said second spring linkage assembly upon operation of said motor, a degree of rotation of said second wheel and said second shaft corresponding to a degree of said flexion of said spring end connected to said second spring linkage assembly.

9. The apparatus as claimed in claim 8 wherein said regulating means comprises:

an electrical circuit with said power source and motor therein;

switch means for controlling said circuit including a plurality of user selectable switches, a user selectable closure of one of said switches closing said circuit for communicating said power source with said motor;

a motor shaft rotatable by operation of said motor and positioned adjacent said switches;

a plurality of lugs about said motor shaft in a one-to-one relationship with each of said switches, a contact of a lug with said one closed switch opening said one switch for ceasing communication of said motor with said power source, said lugs positioned about said motor shaft in a manner wherein a contact of each of said lugs with said one related closed switch results in a different time period of motor operation and rotation of said motor shaft.

10. The apparatus as claimed in claim 9 wherein said lugs are placed about said motor shaft wherein a rotation of said motor shaft causing each said lug to contact said related switch at a different position of rotation of said motor shaft.

11. The apparatus as claimed in claim 6 wherein said second rotating means comprises:

a second shaft defining said associated axis of said second spring linkage assembly;

a second wheel rotatable with said second shaft;

an electric motor in selectable communication with a power source;

a chain driven by said motor and coupled to said second wheel to rotate said second wheel and said second shaft;

means for regulating communication of said motor with said power source, whereby to rotate said second wheel for movement of said second linkage assembly upon operation of said motor, a degree of rotation of said second wheel and said second shaft corresponding to a degree of movement of said second linkage assembly and said flexion of said second spring end connected thereto.

12. The apparatus as claimed in claim 1 further comprising:

a ball rest attached to said frame;

a scoop attached to said second end of said pitching arm;

said arm rotation from said first arm position urging said scoop into movement past said ball rest for deposit of a ball on said ball rest into said scoop prior to said arm reaching said ball release position.

13. The apparatus as claimed in claim 1 wherein said spring comprises a leaf spring.

14. An apparatus for hurling a ball, said apparatus comprising:

a frame;

a pitching arm attached to said frame, said pitching arm adapted for placement of a ball thereon;

means for moving said pitching arm between a first rest position and a second ball hurling position;

a spring assembly including a spring thereon, said spring having a first position and a second flexed position displaced from said first position for storage of potential energy therein;

means for moving said spring to a selectable second flexed position of a plurality of possible second flexed spring positions, whereby to vary the degree of flexion of said spring;

means for transferring a potential energy of said spring at said second position to said pitching arm during said movement of said pitching arm, said transferred energy moving said pitching arm to said ball hurling position for release of a ball on the pitching arm therefrom, a speed of the released ball corresponding in part to the degree of flexion of said spring at said second spring position.

15. The apparatus as claimed in claim **14** wherein said transfer means includes means for changing a trajectory of the released ball, said trajectory in part affecting the speed of the ball presented to the user.

16. The apparatus as claimed in claim **14** wherein said pitching arm moving means comprises:

a wheel having a shaft defining a horizontal axis;

means for rotating said wheel;

means for coupling movement of said pitching arm to rotation of said wheel for rotation of said arm between said first rest and second ball hurling positions.

17. The apparatus as claimed in claim **14** wherein said spring moving means comprises:

a motor energized by a power source;

at least one wheel attached to said frame and rotatable by said energized motor;

linkage means connected to said at least one wheel and said spring, a rotation of said at least one wheel moving of said linkage means in a manner to flex said spring;

means for selectably rotating said wheel from a first wheel position to a second wheel position selectable from a plurality of possible second wheel positions, said selected second wheel position effecting a degree of movement of said linkage means and a flexion of said spring connected thereto.

18. The apparatus as claimed in claim **17** wherein said spring is a leaf spring comprising first and second ends, said linkage means connected to said first or second ends of said leaf spring or both, a movement of said linkage means flexing said spring at said first and second ends thereof or both.

19. The apparatus as claimed in claim **17** wherein said selectable rotating means comprises:

means for energizing said motor by said power source for a user selectable time period chosen from a plurality of possible time periods, said length of said time of motor energization presenting a selectable time of movement of said linkage means and a degree of flexion of said spring attached thereto.

20. The apparatus as claimed in claim **14** wherein said transfer means further includes:

means for further flexing said spring from said second spring position during said movement of said pitching arm from said first position and releasing said flexion of said spring, said means transferring said energy of said released spring to said arm.

21. An apparatus for hurling a ball, said apparatus comprising:

a frame;

a pitching arm rotatably attached to said frame, said pitching arm having a first end and a second end adapted for placement of a ball thereon;

means for rotating said pitching arm between a first rest position and a second ball hurling position;

a spring mounted to said frame, a flexion of said spring from said first position to a second position resulting in a storage of potential energy therein;

means for moving said spring to a second flexed position user selectable from a plurality of second flexed positions, whereby to vary the degree of potential energy stored in said spring;

means for initially coupling said spring at said second flexed position to said pitching arm during said pitching arm rotation and subsequently releasing the potential energy of said coupled spring to said pitching arm during a subsequent arm rotation, said released energy further rotating said pitching arm to said hurling position for release of a ball on said second arm end therefrom, a speed of rotation of said arm regulated in part by to a degree of flexion of said spring at said second spring flexed .,position.

22. The apparatus as claimed in claim **21** wherein said coupling means further regulates a trajectory of the ball released from said second arm end.

23. The apparatus as claimed in claim **21** further comprising:

a ball rest mounted to said frame for placement of a ball thereon, said ball rest in a path of rotation of said arm second end, wherein the ball is deposited on said second arm and during said arm rotation.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

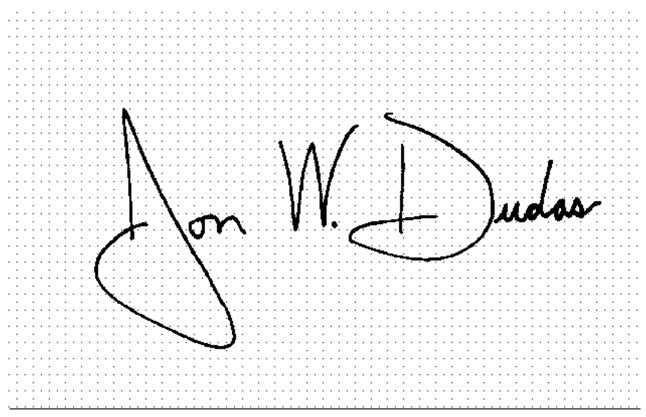
PATENT NO. : 6,715,478 B1
DATED : April 6, 2004
INVENTOR(S) : Steven R. Tanner

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10,
Line 38, delete ".,position" and substitute -- position --.

Signed and Sealed this

Twentieth Day of July, 2004



JON W. DUDAS
Acting Director of the United States Patent and Trademark Office